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There is No Such Thing as a Free Thermodynamic Lunch Or Mold...Why Now?

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Strategies

Mold is a water problem

No water no mold



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Two Big Concepts

Climate and The Second Law

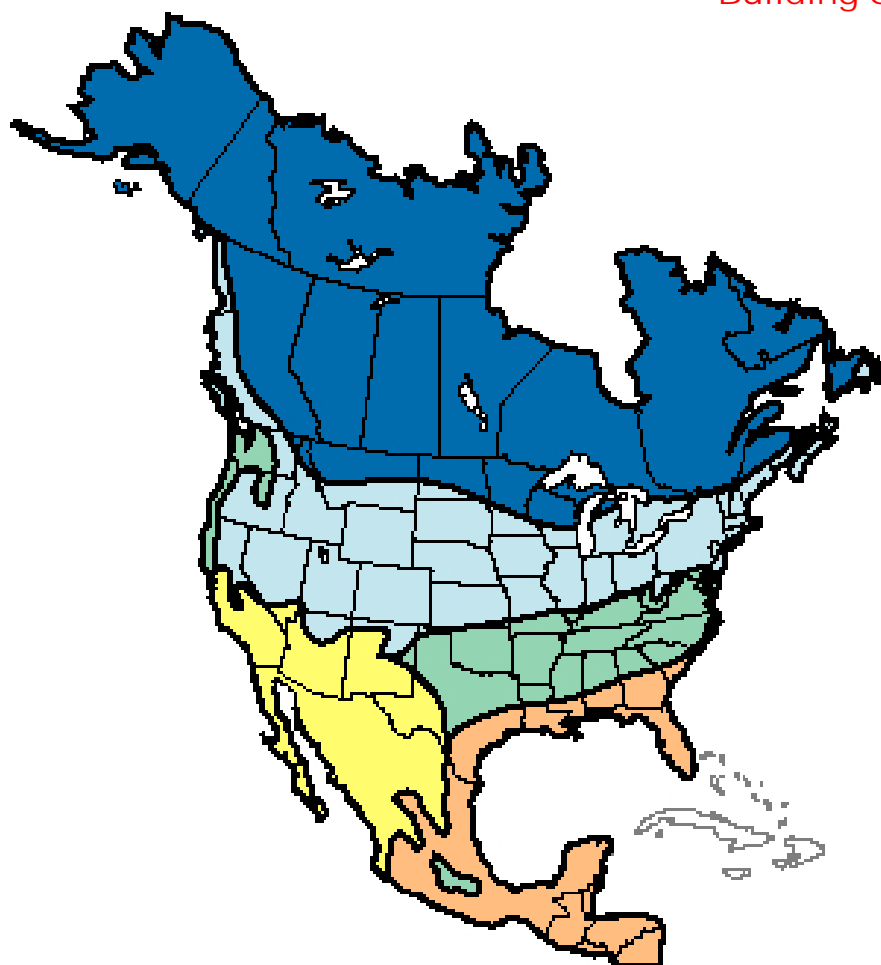
Incidental Water



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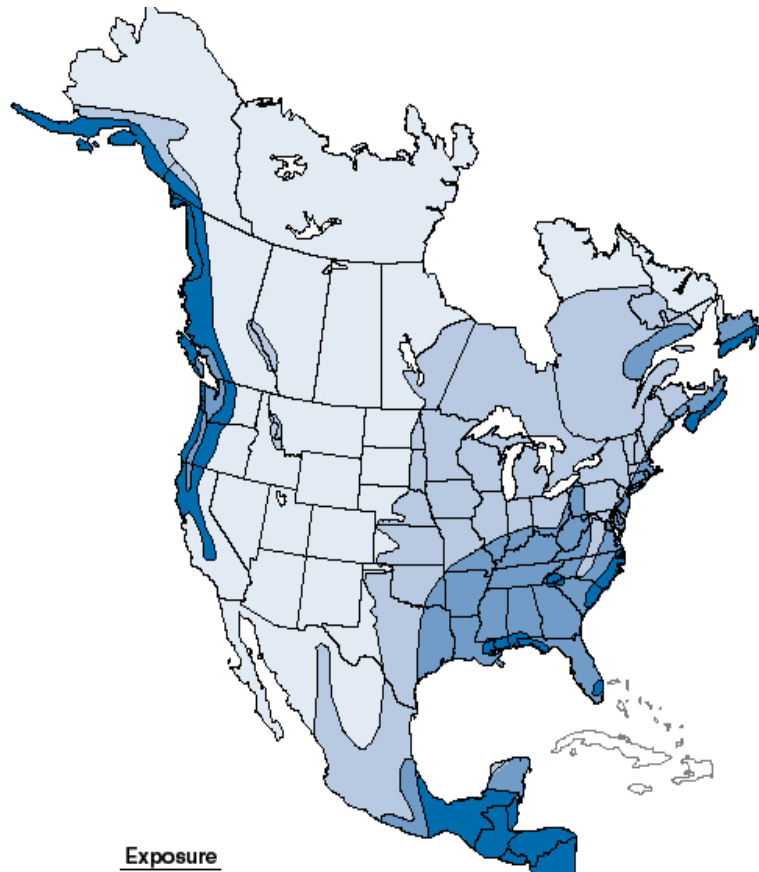


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Exposure

| | | |
|----------|-----------|--|
| Extreme | Over 60" | Pressure Equalized Rain Screen/Pressure Moderated Screen |
| High | 40" - 60" | Rain Screen/Vented Cladding/Vented Drainage Space |
| Moderate | 20" - 40" | Drainage Plane/Drainage Space |
| Low | Under 20" | Face Seal |





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Buildings should be suited to their environment. It is not desirable to construct the same manner of building in Montreal, Memphis, Mojave and Miami. It's cold in Montreal, it's humid in Memphis, it's hot and dry in Mojave and it's hot and wet in Miami. And that's just the outside environment. It is also not desirable to construct the same manner of building to enclose a warehouse, house, school, office, health club with a swimming pool, hospital or museum. The interior environment also clearly matters.



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Firmness Commodity Delight

These are properly designed, when due regard is had to the country and climate in which they are erected. For the method of building which is suited to Egypt would be very improper in Spain, and that in use in Pontus would be absurd at Rome: so in other parts of the world a style suitable to one climate, would be very unsuitable to another: for one part of the world is under the sun's course, another is distant from it, and another, between the two, is temperate.

Marcus Vitruvius Pollio c. 90-20 B.C.E.





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Since we have more mold problems we must have more water problems...duh



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Since we have more mold problems we must have more water problems...duh

But we have less water....



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The Key to Understanding Water Problems Is Understanding Rate-Storage



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Water Problem: When the rate of wetting exceeds the rate of drying, accumulation occurs. A problem exists when the quantity of accumulated moisture exceeds the moisture storage capacity of the material or system. The moisture storage capacity is material, time and temperature specific.



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We are reducing the ability to dry

The materials we build with are different



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We Do the Calculations for the Winter but the Buildings Rot in the Summer

Mark Bomberg



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We have two sides to a wall - the inside and the outside...duh.

Joseph Lstiburek



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Walls Get Wet From the Inside

Walls Get Wet From the Outside

Walls Can Dry to the Outside

Walls Can Dry to the Inside



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Walls Will Always Get Wet

Walls Usually Start Out Wet

Wet Happens



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Strategies

Find The Water... and you will

Find The Mold

Clean Up The Mold

Dry The Building

Make Sure It Doesn't Happen Again



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Strategies

Heat Flow is From Warm to Cold

Moisture Flow is From Warm to Cold

Moisture Flow is From More to Less

Air Flow is From a Higher Pressure to a Lower Pressure

Gravity is Always Down ... the earth “sucks”



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Strategies

Rain and Ground Water Work the Same Way Everywhere

Diffusion and Air Flow are Climate Dependant



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Phases

Solid (snow and ice)

Liquid (rain and ground water)

Vapor (diffusion and air flow)

Adsorbed (surface diffusion)



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The Important Ones

Liquid **(rain and ground water)**

Vapor **(diffusion and air flow)**



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